REPORT

FIVE-YEAR REVIEW
AGRICO SITE
PENSACOLA, FLORIDA

U.S. ENVIRONMENTAL PROTECTION AGENCY REGION IV

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MEMORANDUM

SUBJECT: Agrico Chemical, NPL Site
Pensacola, Florida
Five-Year Review

FROM: Kenneth Lucas, Remedial Project Manager
south Site Management Branch

THRU: Curt Fehn, Chief
South Site Management Branch

TO: Richard D. Green, Director
Waste Management Division

Attached please find the Five-Year Review report for the Agrico Chemical NPL site in Pensacola, Florida.. Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, requires that if a remedial action is taken that results in any hazardous substances, pollutants, or contaminants remaining at the site, the Environmental Protection Agency (EPA) shall review the remedial action no less often than each five years after initiation of the remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

Contaminated media are addressed at the Agrico Chemical Company Site in two Operable Units. Operable Unit One (OU- 1) addresses the cleanup of the source areas on-site. Soil and sludge material were treated by consolidating and stabilizing them under a RCRA cap. This action eliminated the contaminant's migration to ground water. Routine inspections of the cap are conducted as well as a baseline ground water monitoring of up gradient and down gradient wells. After five years from the completion of the remedial action, April 2001, a statistical evaluation of the ground water data will be made to confirm the integrity of the containment system. Remedial activities associated with OU-1 were completed in April 1997.

Operable Unit Two (OU-2) addresses the contaminated ground water on and off site. The remedy consisted of installation of monitoring wells near Bayou Texar, implementation of a surface and ground water monitoring program, an irrigation well survey, a well abandonment program, and institutional controls. Construction of remedial measures associated with OU-2 were completed in July 1999. The actions related to identification and abandonment of irrigation wells within the OU-2 plume is ongoing as part of the operation and maintenance (O&M).

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In accordance with Section VII of Consent Decree No. 90-23-C between the U.S. Environmental Protection Agency (EPA), Freeport McMoran Resource Partners, Limited Partnership (Freeport McMoRan), and Conoco, Inc. (Conoco), EPA requested that the Respondents perform a Statutory Five-Year Review for the Agrico site (Agrico) in Pensacola, Florida, including Operable Units 1 and 2 (OU-1, OU-2).

This report presents the findings of the review and was prepared in accordance with the November 23, 1999 Work Plan. The schedule for report submittal was modified via electronic mail on December 8, 1999. The Work Plan was approved by EPA on December 10, 1999.

The Five-Year Review is required pursuant to the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments Reauthorization Act (SARA), Section 121(c) and Section 300.430 (f)(4)(ii) of the National Oil and Hazardous Substances Contingency Plan (NCP). The review follows OSWER Directives 9355.7-02, -02A and -03-A (EPA May 23,1991; July 26,1994; and December 21, 1995).

1.1 PURPOSE

The purpose of the Five-Year Review is to determine whether the remedy or remedies at the site remain protective of human health and the environment (as in the case of OU-1 where the source has been stabilized using engineering solutions), or where remedial actions are still being implemented (as in the case of OU-2, to confirm that measures are in place to prevent exposure and that the remedy is expected to be protective when all remedial actions are complete).

1.2 SITE DESCRIPTION

The Agrico site is located at the northwest corner of Fairfield Drive and Interstate 110 in Pensacola, Escambia County, Florida. The site is bordered by Interstate 110 to the east, Fairfield Drive to the south, CSX railroad to the west, and a construction business to the north. An approximate 100-foot-wide Gulf Power Company easement and overhead electrical lines are near the eastern boundary of the site. Site access is from the north side of Fairfield Drive, approximately 600 feet (ft) west of the Interstate 110 overpass. The vicinity location is illustrated in Figure 1.

The Agrico site is composed of two operable units. OU-1 covers the site-specific location of the former Agrico Chemical Site. OU-2 coincides with the area downgradient of the site where the ground water is impacted by EPA-specified constituents of concern. The OU-1 and OU-2 areas are shown on Figure 1.

1.3 SITE HISTORY

Industrial processes at the site began in 1889 by a company that produced sulfuric acid from pyrite. The production of sulfuric acid continued at the plant until approximately 1920. The sulfuric acid was manufactured in lead pots, in a building slightly north of an on-site wastewater pond. Production of normal superphosphate fertilizer was initiated in 1920. The source rock used in the process was fluorapatite, which also contained silica and trace levels of many metals such as aluminum, along with uranium at 20 to 200 parts per million (ppm), as impurities. Superphosphate was produced through the digestion of the source rock with sulfuric acid and

water. The reaction produced anhydrite and fluoride as by-products. The anhydrite portion remained with the product and was sold as part of the product, unlike modern wet process phosphoric acid plants which filter the anhydrite (phosphogypsum) out and stockpile it on-site. Several different companies produced fertilizer on-site between 1920 and 1975, including Agrico Chemical Company, who purchased the facility in 1972 and operated the plant until 1975, when operations ceased.

The site was in operation under various owners for nearly 100 years. The former plant buildings and process equipment were demolished in late 1979. Building debris was spread across the site after demolition, with the exception of the concrete foundations, which remained in place. The majority of the debris and concrete foundations were later consolidated and placed with the waste material under the RCRA cap during OU-1 Remedial Action (RA) activities. There are no permanent buildings from the original operations remaining on the site.

Since 1957, when City of Pensacola officials shut down a public supply well located downgradient of the site due to elevated levels of fluoride and sulfate in the ground water, this part of Pensacola has been designated by water utility planners as an area restricted for development of new wellfields.

The U.S. Environmental Protection Agency (EPA) conducted a Hazardous Waste Site Investigation in October 1983. The results of the study indicated that the on-site soils and surface water were contaminated with elevated levels of fluoride and lead. Ground water was not sampled during that investigation. However, an effort was made to locate private shallow wells in the area, and none were located.

The Florida Department of Environmental Protection (FDEP) conducted a ground water assessment at the site in January 1987. The study concluded that the site contaminants, primarily fluoride and sulfate, had impacted the area ground water. EPA listed the site on the National Priorities List (NPL) on October 4, 1989.

Conoco and Freeport McMoRan entered into an Administrative Order on Consent (AOC) on September 29, 1989. Subsequently, Freeport McMoRan was sold to IMC Global. According to the terms of the AOC, Conoco and Freeport McMoRan agreed to conduct source (soils) and ground water investigations at the site. Currently, The Williams Companies (Williams) represents Agrico Chemical and is responsible, along with Conoco, for implementing the remedial actions for this site.

1.4 HYDROGEOLOGIC FRAMEWORK OF THE SAND-AND-GRAVEL AQUIFER

The vertical profile of the Sand-and-Gravel aquifer consists of beds of sand and gravel interbedded with beds of silt, clay, and fine sand sediments. The permeability of these beds is quite variable, both laterally and vertically. However, the subsurface sequence can be divided into three major permeability zones. These zones vary greatly throughout Escambia County. In addition, individual beds of sand or clay within these zones are highly discontinuous, resulting in considerable heterogeneity within the zones. The major zones are the surficial zone, the low permeability zone, and the main producing zone (Roaza, et al., 1991).

1.4.1 Surficial Zone

The surficial zone consists of the uppermost layer of sediments. It contains the unsaturated zone and the water table. The surficial zone varies in thickness, but is generally less than 100 ft beneath the OU-2 monitoring area. The surficial zone consists primarily of quartz sand ranging in size from fine to gravel. Thin beds of limonite-cemented sandstone also occur. The zone contains thin beds of clay and silt, which are highly discontinuous. These low-permeability beds occur both in the unsaturated and the saturated portion of the zone. Ground water within the surficial zone moves downward through the underlying lower-permeability zone to recharge the main producing zone of the aquifer or moves laterally to discharge to streams or rivers.

1.4.2 Low-Permeability Zone

The low-permeability zone underlies the surficial zone and is composed of sediments with overall lower permeability characteristics than those sediments above or below the zone. This zone forms a semi-confining layer which acts to restrict the vertical flow of ground water between the overlying surficial zone and the underlying main producing zone. It consists of a poorly sorted mixture of sand, silt, and clay. The actual lithology of this zone is variable, ranging from poorly sorted sand and silt to sandy clay to significant clay beds. Locally, well-sorted, water-bearing sands also occur within this zone. Poor sorting and a higher percentage of clays and silts distinguish this zone from the other zones. The thickness of this zone in the subsurface underlying the facility ranges from about 20 to 50 ft (Roaza, et al., 1993).

The thickness and lithology of this zone is important because of its effect on the vertical permeability. The vertical permeability of this zone reduces the ground water flow from the surficial zone to the main producing zone.

1.4.3 Main Producing Zone

The main producing zone is the most productive portion of the Sand-and-Gravel aquifer and is the zone tapped by most water supply wells. The main producing zone is the deepest portion of the aquifer. The ground water within this zone exists under semi-confined conditions. The main producing zone consists of moderate to well-sorted sand and gravel, along with minor interbedded layers of sandy clay and clay. Locally and regionally, variations occur in the lithology of the main producing zone. Changes with depth tend to be more subtle and include varying grain size distribution and changes in the degree of sorting.

The clay beds interbedded within the zone generally constitute 10 to 40 percent of the thickness. In some areas, the productive intervals as well as the clay layers can be correlated and appear to be continuous over a distance of many miles. The thickness of the main producing zone approaches 200 ft (Roaza, et al., 1993).

The main producing zone is recharged by leakage through the low-permeability zone. The actual amount of recharge is determined by the hydraulic head difference between the surficial zone and the main producing zone, and the vertical permeability of the low-permeability zone. Under static conditions, discharge from this zone occurs to Bayou Texar downgradient of the site.

1.4.4 GROUND WATER FLOW BOUNDARIES

Within OU-2, the path of ground water flow depends largely on the composition of the aquifer, head variations, and proximity to discharge boundaries. Ground water flows laterally and vertically (both upward near the discharge boundary and downward in recharge areas) within the Sand-and-Gravel aquifer. Interbedded clays tend to inhibit vertical movement. Head variations between zones are important in controlling the vertical direction of ground water flow.

The flow direction downgradient of OU-1 is primarily controlled by the Bayou Texar discharge boundary condition. Near the bayou, vertical head differences between aquifer zones cause ground water to flow vertically from the main producing zone upwards, and ground water discharges to the bayou. There is ample evidence that the bayou is a discharge boundary for both the surficial and main-producing zones of the aquifer and that ground water does not pass under the bayou as underflow. Water levels within both zones to the north, east, and west indicate ground water flows to the bayou. The hydraulic head for the main producing zone at the bayou is higher than for the other zones within the aquifer.

Monitoring wells AC-27S and AC-27D, which are located on the east side of Bayou Texar (Figure 1), and directly across from where a portion of the Agrico plume is projected to discharge, substantiate the upward flow direction for the main producing zone. The head for AC-27D is 0.42 ft higher than that of AC-27S. More importantly, site constituents of concern have not been detected in these wells.

Boundary conditions for Bayou Texar have been substantiated by comprehensive ground water modeling using actual water level data for modeling calibration. The work has primarily been conducted by the Northwest Florida Water Management District (NWFWMD). Information concerning the discharge boundary for Bayou Texar is found in the following references.

- NWFWMD. June 1993. Numerical Modeling of Ground Water Flow and Contaminant Transport in the Sand-and-Gravel Aquifer, Escambia County, Florida
- NWFWMD. April 1996. Analysis of Ground Water Availability in the Cordova Park Area, Southeastern Escambia County, Florida
- NWFWMD. December 1997. Wellhead Protection Area Delineation in Southern Escambia County, Florida

Due to the ground water flow conditions at Bayou Texar, the Agrico plume is not expected to extend east of the bayou.

1.4.5 Modeling of Ground Water Flow and Solute Transport

As part of evaluating remedial alternatives for the Agrico site, comprehensive, detailed ground water flow and solute-transport modeling was conducted as part of the Final Feasibility Study (June 23, 1993). The modeling determined the length of time necessary for the aquifer to undergo natural remediation with respect to the site ground water contamination. The modeling yielded information on the movement of dissolved chemical constituents in ground water and predicted the fate of contaminants emanating from the site.

The modeling indicated that under existing flow conditions with no active remediation of ground water, natural attenuation of the site ground water contamination would occur within 70 years.

Specifically, the modeling indicated that fluoride in the aquifer declines to 4 milligrams per liter (mg/L) in 70 years. The maximum contaminant level (MCL) for fluoride is 4 mg/L.

The selection of fluoride over other site chemicals for modeling purposes followed the rationale that: 1) fluoride concentrations are highest in the aquifer relative to the federal standard or MCL for that chemical, and 2) fluoride movement through the aquifer demonstrates the worst-case scenario for fate and transport behavior of a contaminant emanating from the site.

1.5 RECORD OF DECISION – OU-1 SUMMARY

The Record of Decision (ROD) was issued on September 29, 1992, by EPA and addressed the source (soils and sludges) control designated for the site. Based on consideration of the requirements of CERCLA, the NCP, the detailed analysis of alternatives, and public and state comments, EPA selected Alternative 4, as identified in the Feasibility Study (FS), as the source control remedy for this site. Alternative 4 includes, in general, the following:

- Excavating and consolidated the impacted soils above 1,463 milligrams per kilogram (mg/kg) of fluoride from former wastewater ponds designated PFP I, PFP II, PFP III, and PFP IV
- Excavating, stabilizing, and consolidating into PFP II the soils and sludges contaminated with lead above 500 mg/kg and arsenic above 16 mg/kg in the area of PFP IV
- Constructing a slurry wall around PFP II (encompassing the consolidated waste)
- Constructing a multimedia RCRA cover system over the area enclosed by the slurry wall
- Monitoring ground water quality, limiting access, and providing deed restrictions

The performance standards for excavation of the soils/sludges were developed to protect human health, to prevent contamination of the ground water, and to be in compliance with the applicable or relevant and appropriate requirements (ARARs). The performance standards are:

- Chemical Performance Standards

  Fluoride 1,463 mg/kg

  Lead 500 mg/kg

  Arsenic 16 mg/kg

- Treatment and Containment Performance Standards

Parameter	Performance Standard
Strength Testing Unconfined Compression	50 psi
Penetrometer	50 psi
TCLP Lead	</=5.0 ppm
TCLP Arsenic	</=5.0 ppm
Permeability	1×10^{-10} cm/sec Revised by EPA to 1×10^{-7} cm/sec

1.6 RECORD OF DECISION OU-2 SUMMARY

A ROD for OU-2 was issued by EPA Region IV on August 18, 1994. The OU-2 ROD presents EPA's selected remedial action for treatment of ground water. The OU-2 Remedy addresses the

ground water and is the final action for the two operable units at the site. The following are excerpts from the OU-2 ROD:

> State requirements that are legally applicable or relevant and appropriate The selected remedy is protective of human health and the environment, complies with Federal and to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. The reduction of toxicity, mobility, and volume of the site ground water contamination will be achieved through source control (OU-1) and monitored natural attenuation (OU-2).
>
> EPA views the natural attenuation remedy as more protective of human health and the environment than the pump-and-treat technology alternatives considered. This limited action avoids potentially adverse impacts associated with the ground water extraction and treatment alternatives. The negative impacts of a pump-and-treat cleanup method include: 1) spreading of off-site plumes of contamination, such as the Escambia Treating Company (ETC) site organics plume; 2) salt water intrusion; and 3) changing ground water flow patterns in the Sand-and-Gravel aquifer, the consequences of which could potentially threaten drinking supply wells.
>
> The selected remedial alternative for OU-2 involves action aimed at limiting exposure while natural attenuation processes remediate the ground water impacts. The remedial alternative consists of the following: 1) ground water sampling, to include the installation of 2 additional monitoring wells adjacent to Bayou Texar; 2) Bayou Texar surface water sampling; 3) a door-to-door irrigation well survey; 4) institutional controls to include on-site deed restrictions, ground water use restrictions, and a request that private land owners allow the plugging and abandoning of impacted or potentially impacted irrigation wells; and 5) an advisory program. These activities include restrictions that will limit ground water usage and contact in the downgradient vicinity of the Agrico Site. In addition, this alternative includes a comprehensive ground water monitoring plan to periodically evaluate the hydrogeologic conditions and quality of ground water in the Sand-and-Gravel aquifer underlying the operating unit.
>
> This remedial alternative envisions a cooperative effort between the parties conducting the remediation and the local, state, and federal regulatory agencies to ensure that no one is exposed to the contaminated ground water associated with the site. Although potable water is currently supplied by the city, a comprehensive door-to-door survey will be conducted to verify that previous well surveys are accurate in the assumption that no one is drinking ground water from irrigation wells within the Agrico contaminant plume.
>
> A comprehensive ground water and bayou surface water-monitoring program will be implemented, and the results will be incorporated into an advisory program conducted by the NWFWMD/Escambia County Utilities Authority (ECUA) for modeling/contarninant tracking.

Implementation of the OU-2 Remedy in conjunction with source treatment and containment will protect human health and the environment. The use of source treatment and containment will eliminate the source of ground water impacts from the Agrico plume.

EPA has identified the OU-2 Remedy as the preferred course of action for addressing contaminated ground water related to the Agrico Site. While other alternatives which were evaluated may reduce the toxicity, mobility, and volume of site constituents in the ground water, other nearby contamination from off-site sources unrelated to the Agrico Site would spread, further degrade the aquifer, and pose an even greater risk. Therefore other alternatives were less protective than the Limited Action Alternative selected by EPA for OU-2.

Based on current hydrogeologic conditions, it is unlikely that nearby water supply wells will be impacted by the Agrico ground water plume. However, in an effort to monitor the potential impact of the Agrico plume to any water supply wells, EPA has approved a Limited Action remedy for OU-2 which will evaluate ground water quality as natural attenuation, flushing, and dispersion of the plume occur within the ground water system.

Additionally, if the Agrico plume adversely impacts ground water being withdrawn by public supply wells in the area, a contingency remedy will become necessary. The contingency remedy includes wellhead treatment or well replacement.

2.1 REMEDIAL ACTION OBJECTIVES - OU-1

The following discussion of remedial action objectives represents excerpts from the OU-1 ROD:

> Soil cleanup goals are required for direct contact, ingestion and inhalation of dust (risk-based). A soil level is also necessary which is protective of ground water (leachability-based) for both organic and inorganic constituents.
>
> Risk-based remediation goals were determined for several exposure scenarios. Due to the expected continued industrial zoning at the Agrico site, risk-based action levels based on an industrial cancer risk of $1x10^{-6}$ are considered appropriate. Remedial goals that are protective of ground water were also developed. A number of contaminants evaluated in the Baseline Risk Assessment (BRA) and the Feasibility Study (FS) are not assigned remediation goals, because the contaminant was present, but in very low concentrations or isolated areas. Also, those contaminants that were determined not to be site related were not assigned remediation goals. This included the organic contaminants. Several methods were used to develop these goals.
>
> The method used to determine the leachability-based cleanup level for organic components was the Summers Model. The Summers Model assumes that some percentage of rainfall will infiltrate and desorb constituents present in the soil matrix which will eventually reach the ground water. This adsorption mechanism is based on soil: water partition coefficients.
>
> Ultimately, remediation goals were appropriate for fluoride, arsenic, and lead. The remedial goal established for fluoride is based on protection of ground water. Fluoride, arsenic, and lead are considered representative of the entire inorganic profile and are used as target compounds. The remedial goals established for lead and arsenic are calculated based on health-based soil exposure scenarios.
>
> To determine a cleanup level for fluoride in soil that is protective of ground water, a site-specific approach was developed. The cleanup level for fluoride is calculated based on the maximum allowable perimeter ground water concentration of 4 mg/L for fluoride, which translated to a maximum allowable toxicity characteristic leaching procedure (TCLP) concentration via a dilution factor. The calculation accounts for the mixing and dilution in the aquifer does not assume any retention, or attenuation of constituents in saturated soil, and presents a worst-case, maximum concentration effect of leachate on ground water. This approach was recommended by the Florida Department of Environmental Regulation (FDER), (currently FDEP), with EPA concurrence. In addition, the calculation used was based on total fluoride concentrations found in the soil. Based on the above site-specific approach, the soil remediation goal for total fluoride was calculated to be 1,463 mg/kg.
>
> Lead contamination is confined to surficial soils in the area of PFP IV. In addition, lead is not impacting ground water. Therefore, the lead remediation goal of 500 mg/kg is based on health risk associated with the hypothetical future child residential scenario. The conservative approach for a lead cleanup goal was

determined by the lead uptake/biokinetic (UBK) model. The soil cleanup number represents the concentration which the model predicts would result in 95% of a hypothetical future child residential population having a blood lead concentration less than the EPA benchmark of 10 ug/dl.

The remedial goal for arsenic in soils of 16 mg/kg is based on an industrial scenario at the 10^{-6} risk level based on ingestion and inhalation pathways. In summary, the soil remediation goals are:

CHEMICAL	REMEDIATION GOALS (mg/kg)
Fluoride	1,463
Lead	500
Arsenic	16

Based on soil treatability studies conducted as part of the FS, solidification/stabilization of the fluoride will result in solidification/stabilization of the lead and arsenic as well. Lead is known to have a low mobility is soils. Site-specific data support the low mobility, because the lead contamination is confined to surficial soils in the area of PFP IV only.

2.2 REMEDIAL ACTION OBJECTIVES – OU-2

The following discussion of remedial action objectives represents excerpts from the OU-2 ROD:

A number of contaminants evaluated in the Baseline Risk Assessment (BRA) and the FS were not assigned remediation goals, because the contaminant was present, but in very low concentrations or isolated areas. Also, those chemicals found at levels that did not pose a health risk were not assigned remediation goals.

Soil cleanup goals were developed for the site soils and were required for direct contact, ingestion, and inhalation of dust (risk-based). Soil cleanup goals are also necessary which are protective of ground water (leachability-based), for both organic and inorganic constituents. In addition, risk-based remediation goals were determined for several exposure scenarios. A variety of methods were used to develop remedial goals for soils and are discussed in the OU-1 ROD (source control).

The ground water remedial action objectives for protection of public health and the environment at the Agrico Chemical Site are:

- Prevent continued degradation of the ground water from on-site sources

- Prevent or minimize degradation of the ground water resource due to effects associated with the selected remedy such as the spreading of off-site plumes, including the organics plume emanating from the Escambia Treating Company (ETC) site and saltwater intrusion

- Prevent or minimize future exposure to contaminated ground water that would result in unacceptable risk

- Prevent of minimize future impacts to surface water due to discharge of contaminated ground water to Bayou Texar

The following table represents ground water cleanup goals based on federal or state primary and secondary drinking water standards. This list of chemicals includes all chemicals with unacceptable risks for the current risk scenario. Because of the accessibility of public water supply in this area, it is unlikely that residents will be exposed as envisioned in the future risk scenario. Therefore, the future risk scenario from the baseline risk assessment is not considered in developing these cleanup levels.

The Performance Standards selected for the chemicals of concern are as follows:

Contaminant of Concern	Cleanup Level (mg/L)
Fluoride	4 mg/L (ppm)*
Arsenic	0.05 mg/L (ppm)
Chloride**	250 mg/L (ppm)
Sulfate**	250 mg/L (ppm)
Nitrate + nitrite	10 mg/L (ppm)
Radionuclides Radium 226 Radium 228	 5 pCi/L (Radium 226, 228 combined)

* The MCL of 4 ppm for fluoride is the cleanup level for ground water. The Florida secondary standard of 2 ppm contained in Section 17-550.320, FAC, will apply at nearby municipal potable supply wells as specified in the contingency remedy.

** Chloride and sulfate were not included in the baseline risk assessment because no toxicity values exist. The remedial goals presented for chloride and sulfates are the Florida ARARs.

3.1 OPERABLE UNIT ONE

The first operable unit (OU-1) addressed the cleanup of the source on-site. Soils and sludge material have been treated by consolidating and stabilizing under a RCRA cap. This action eliminated contaminant migration to the ground water. A ROD for OU-1 was issued by EPA, Region IV on September 29, 1992. The major components of the selected remedy for treatment of the soils on-site included:

- Excavation and solidification/stabilization of approximately 45,000 cubic yards of contaminated sludge and soils from site sludge ponds
- Consolidation of all stabilized sludge and soils into one sludge pond (approximately 423,000 cubic yards of contaminated soils and sludge)
- Construction of RCRA cap over the sludge pond
- Construction of slurry wall upgradient of RCRA cap
- Implementation of institutional controls including security fencing, access, and site deed restrictions
- Ground water monitoring for OU-1

The remedial activities associated with OU-1 were completed in April 1997.

3.1.1 Operations and Maintenance

In accordance with the EPA-approved Operations & Maintenance (O&M) Plan for OU-1, dated September 20, 1996 biannual inspections, as well as inspections following major storm events, are conducted at the site. Elements of the O&M are described as follows:

In accordance with the OU-1 September 20, 1996 Operation and Maintenance Plan (O&M), baseline ground water monitoring is to be conducted for a period of five years from 1997. Following the five year period (1997-2001), an evaluation of the concentration variability will be conducted and a statistical approach will be developed to assist in evaluating data results to confirm the integrity of the containment system.

- General Facility Inspection

  As part of the biannual general inspection of the OU-1 Agrico site, field observations of perimeter fencing, gates and locks, signage, and roadway conditions are conducted. The inspections to date have found the perimeter fencing intact, with no visible damage observed; all gates and locks are in proper working condition; the warning signs posted on the perimeter fencing are in place and undamaged. In addition, DSI Security Services continues monthly routine site patrols and has reported no unusual findings at the site. The roadways on-site are in good condition.

- Cover System Inspection

  The OU-1 RCRA cap cover system is inspected as part of the biannual inspections to evaluate cap settlement, rainfall effects on the top and sideslopes of the cap, and ponding of water on top of the cap. The cover inspections are also conducted to ensure cover soils

and vegetation remain intact and monthly maintenance activities are performed in accordance with the O&M Plan.

To date, the overall condition of the cap cover is satisfactory. No cap settlement or ponding of water has been observed during the inspections. The permanent grasses (Bahia/Bermuda) are established on-site. The on-site mowing frequency is being conducted in accordance with the OU-1 O&M Plan.

- Topographic Survey

Pursuant to Section 2.3.1 (Topographic Surveying) of the OU-1 O&M Plan, a topographic survey of the Agrico site was conducted in April 1998 by Pittman and Associates of Pensacola, Florida (a Florida licensed land surveyor). Upon completion of the topographic survey, a comparison between the original survey of OU-1 and the April 1998 survey was conducted and reported in the June 17, 1998 inspection report. Pittman and Associates compared the data and determined that the surveys were in basic agreement and that no settling and/or erosion had taken place. The next topographic survey of the OU-1 site is scheduled for April 2002.

- Surface Water Collection System Inspection & Annual Cleaning of Underdrain System

During the biannual inspections, the surface water inlets, culverts, drainage pipes, and detention ponds are visually inspected to ensure that no obstructions or hindrances were affecting the performance of the surface water drainage system. There have been no obstructions or hindrances to the drainage system observed. Previously, in April 1999, a plumbing snake and water jetting was used to clean the underdrain system, as required in the OU-1 O&M Plan. In addition, the north and south detention ponds were inspected in November 1999 and observed to be in good condition. The south detention pond was partially dry upon inspection, and heavy vegetation was present in the pond bottom. Although plant vegetation is present in much of the south pond, infiltration of ground water has not been adversely affected.

- FDOT Annual Contact

As per Section 2. 1.1 of the O&M Plan, the Florida Department of Transportation (FDOT), Northwest District Office, Chipley, Florida is to be contacted once a year to determine if there are any plans to perform work on Fairfield Drive, which would include intrusive work in the subsurface sediments. Responses by the FDOT are incorporated into the biannual inspection reports submitted to EPA. No significant intrusive work related to Fairfield Drive has been identified by FDOT (as of December 1999) for the next five years.

3.1.2 Ground Water Monitoring

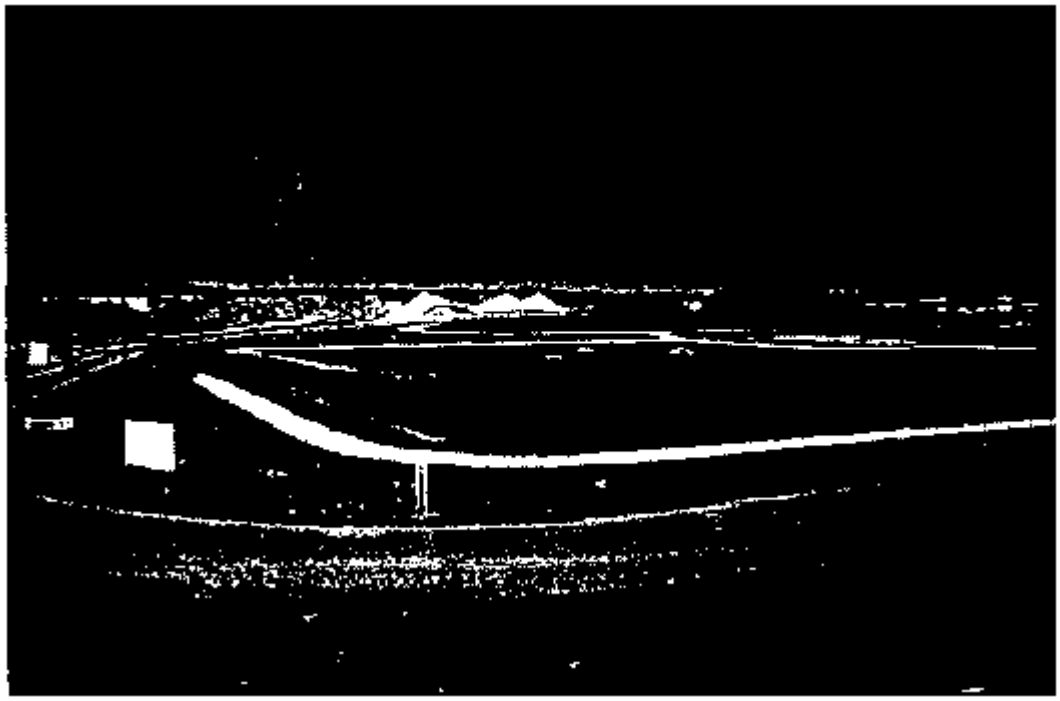
Currently, a ground water monitoring program consisting of upgradient and downgradient monitoring wells has been implemented to monitor the effectiveness of the OU- remedy and is separate from the OU-2 ground water monitoring network. Extensive testing for CERCLA Target Analyte List and Target Contaminant List (TAL/TCL) constituents was completed as part of the Site RI Phase I. Based on results of the testing, appropriate constituents of concern were developed for the Agrico site. The OU-1 ROD, Section 7.1 (pages 34 and 3 5), states:

> ". . . . .a number of contaminants evaluated in the baseline risk assessment and feasibility study are not assigned remediation goals, because the contaminants that were determined not to be site-related were not assigned remediation goals. This included the organic contaminants.... Ultimately, remediation goals were appropriate for fluoride, arsenic, and lead."

Fluoride, arsenic, and lead are sampled and analyzed semiannually in May and November of each year. Baseline monitoring has been conducted for three years. The results are summarized in Table 1.

3.2 PHOTOGRAPHIC SUMMARY OF OU-1

The following sets of photographs show the current conditions at OU-1 and document that the area is well maintained. Photographs were taken on January 8, 2000.

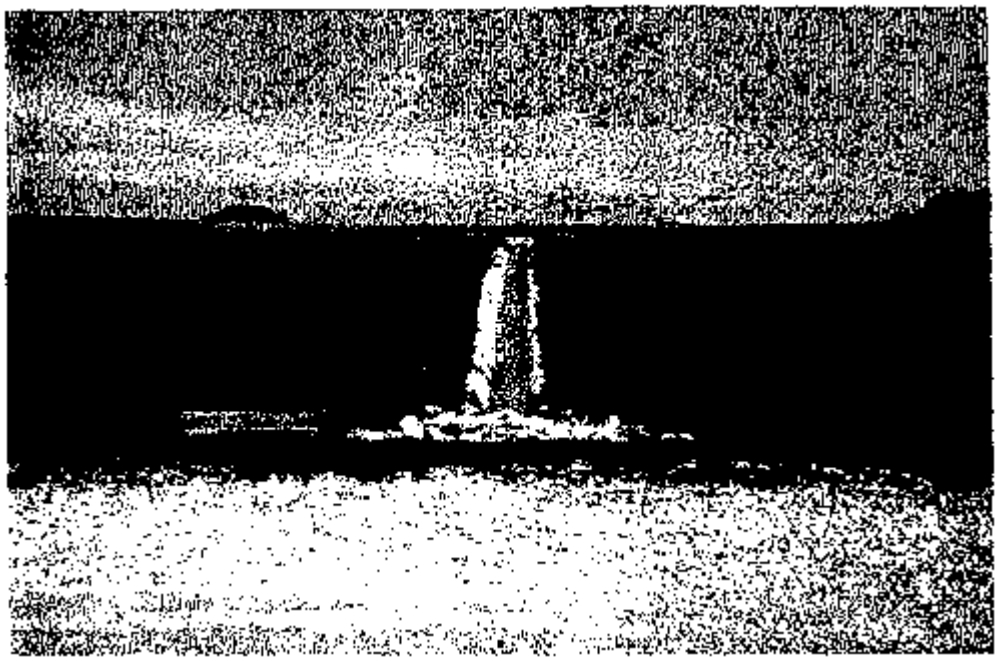


View from southwest looking northerly across south storm water impoundment.

View looking westerly across the top of the RCRA cap.

View looking southerly from the top of the RCRA cap toward the entrance to the site.

View looking northerly across north storm water impoundment from the top of the RCRA cap. Piles at rear are on adjacent construction business property.



Typical concrete storm water conveyance which drains storm water off the RCRA cap down the side slope into underground storm water piping system which drains to impoundment.

Looking easterly down side slope of RCRA cap from site entrance

3.3 STATUS OF OU-2 RA ACTIVITIES

The Remedial Action Work Plan and Related Plans (November 1998) for OU-2 were approved by EPA on April 26, 1999, pending modifications as a result of various communications between EPA, FDEP, Williams, and Conoco. Based on EPA comments, revisions to the Work Plan were submitted on April 23, 1999. The Remedial Action Work Plan was implemented during 1999, and the Implementation Report is due to EPA in February 2000.

The major components of the Remedial Action Work Plan are as follows:

- Install two new main producing zone monitoring wells near Bayou Texar
- Implement a ground water monitoring program
- Implement a surface water monitoring program
- Complete a detailed irrigation well survey and determine uses of irrigation water, including filling a swimming pool or as a drinking water source
- Develop an advisory program which provides information on the status of the site to regulatory agencies and informs water well contractors and irrigation system installers of ground water conditions within the OU-2 area
- Develop a coordinated program between local, regional, state and federal agencies for maintaining institutional controls within the OU-2 area

3.3.1 Monitoring Well Installation

Two 4-inch-diameter monitoring wells were installed at two locations on Gamara and Escambia Streets near Bayou Texar in July 1999. Mr. Roger Carlton (EPA, Athens) observed the

installation of the monitoring wells. These wells were completed in the main producing zone of the Sand-and-Gravel aquifer.

3.3.2 Ground Water Monitoring

In November 1999, the long-term monitoring network as defined in the Remedial Action Work Plan (November 1998) was sampled for the OU-2 constituents of concern. The 1999 results were compared to sampling results for 1992 and 1997. Table 2 presents a compilation of these results.

November 1999 sampling results for the surficial zone indicate that five of six constituents of concern meet the performance standards as stated in the August 18, 1994 ROD. These include arsenic, chloride, sulfate, nitrate and nitrite, and combined radium 226/228. Fluoride is the only constituent exceeding the performance standard.

Ground water in the main producing zone was below the performance standards for arsenic, chloride, and sulfate for all locations sampled.

3.3.3 Surface Water Monitoring

In November 1999, the long-term monitoring network for Bayou Texar, as defined in the Remedial Action Work Plan (November 1998), was sampled for fluoride, arsenic, chloride, sulfate, nitrate and nitrite, and radium 226 and 228. Chloride and sulfate concentrations were found at levels higher than the performance standards. The detected concentrations were also higher than those previously found within the plume area by at least an order of magnitude. The concentrations found for chloride and sulfate are typical of concentrations for estuary environments and are not the result of Agrico plume ground water discharge to Bayou Texar. All other constituents were detected at concentrations below the performance standards.

3.3.4 Detailed Irrigation Well Survey

In July 1999, a survey was distributed to the residents of the OU-2 area in accordance with the Remedial Action Work Plan. The mail-out used addresses from the U.S. Postal Service. A total of 1,638 surveys were distributed, and 338 responses were received between July 1999 through December 1999. Twenty-three irrigation wells were identified from the survey that were previously unknown. Additionally, 10 wells were identified through the 1999 survey which overlapped previously known data. Based on previous information and the survey results, a total of 57 wells have been identified within the OU-2 area. Nearly 50 percent of the 57 wells lie outside the performance standard extent as defined by the comprehensive ground water sampling conducted in September 1997.

In addition to identifying whether an irrigation well existed at the address, it was also the intent of the survey to identify the types of uses of the irrigation well. After follow-up phone calls for those who responded with uses other than irrigation, only one irrigation well was determined to be used for purposes other than irrigation. The use identified was to occasionally fill a swimming pool. All other wells were used for irrigation only. After the follow-up, it was determined that none of the survey respondents were using irrigation wells as a drinking water source. The entire OU-2 area is served by the Escambia County Utilities Authority (ECUA) public water system.

The one address identified as using irrigation well ground water to fill the swimming pool was sampled for volatiles, semi-volatiles, metals, and the Agrico constituents of concern. Results indicated that the well presently lies outside the Agrico plume and that no other sources were currently impacting the ground water at this location.

3.3.5 Advisory Program

In July 1999 an advisory notice was sent to water well contractors, irrigation system installers, and pool contractors, informing them that ground water is impacted south of Fairfield Drive, east of Palafox Street, north of Cross Street, and west of Bayou Texar. The notice stated that the construction of wells in this area, including lawn irrigation wells, may be restricted due to the occurrence of impacted ground water. The contractors were advised to contact the Northwest Florida Water Management District and the Northwest District of FDEP for further information. Additionally, on December 17, 1999 a summary of the site activities was distributed to FDEP (Pensacola), FDEP (Tallahassee), ECUA, NWFWMD, City of Pensacola (Engineering Division), and the Escambia County Health Department.

3.3.6 Institutional Controls Coordination

On December 17, 1999, a memorandum was distributed to FDEP (Northwest District), FDEP (Tallahassee), Escambia County Utility Authority, Northwest Florida Water Management District, City of Pensacola (Engineering Division), the Escambia County Health Department, and EPA. The memorandum solicited information on any changes in regulatory rules or policy that might affect the institutional controls currently in place for the OU-2 area. Additionally, further information regarding the Kaiser Fertilizer Site and radium sampling being conducted by FDEP and the Escambia County Health Department was requested. It is planned that this Five-Year Review Report and the OU-2 Remedial Action Implementation/Annual Report will be distributed to the specified agencies for information purposes once approved by EPA.

3.4 OTHER IDENTIFIED SOURCES ADJACENT TO THE AGRICO OU-2 AREA

In March 1999, FDEP identified the Kaiser Fertilizer Site as contributing contamination to the ground water, which has impacted monitoring wells in the Agrico monitoring network. Downgradient wells, AC6S and AC6D, are influenced by significant concentrations of fertilizer-related constituents, including ammonia, chloride, and nitrate from the Kaiser site. This site is currently being assessed by FDEP to define the extent of impact.

Through routine sampling of public supply wells in Escambia and Santa Rosa Counties, it has been determined that elevated radium 226/228 concentrations are present in several areas of each county. The consequences of these findings are that the elevated concentrations lie in areas outside of the OU-2 area. These are areas that could not be influenced by the Agrico plume. FDEP has tentatively concluded that other sources exist which may be the cause of the elevated radium concentrations, and they are currently investigating these areas.

Further information for the Kaiser site and the radium sampling has been requested from FDEP.

3.5 ARARS REVIEW

The remedies for OU-1 and OU-2 comply with federal and state requirements that are applicable or relevant and appropriate to the remedial action. However, the State of Florida FDEP has commented that nitrate and nitrite need to be sampled separately, since they have individual primary ground water standards of 10 mg/L and 1 mg/L, respectively. FDEP stated in their comment letter of January 27, 1999, that the nitrogen species need to be established. Historical information collected in Escambia County and from the site during the RI/FS presented on November 10, 1998 indicates that nitrate is the dominant nitrogen species. Where nitrate and nitrite have been collected separately, the nitrite is detected under the primary standard of 1 mg/L. The ROD for OU-2 states nitrite and nitrate will be sampled together.

Another clarification of the ROD language concerns the denial of permitting for irrigation wells within OU-2. The ROD states that "with respect to irrigation wells, proposed and in progress irrigation wells will be denied permitting by the NWFWMD pursuant to FAC[17] 62-524." FAC 62-524 refers to the construction of public supply wells in known contamination areas and does not regulate irrigation wells. This rule is implemented by FDEP. NWFWMD policy is to review applications for well construction in southern Escambia County. The policy procedure includes sending a letter to the applicant notifying them that the ground water at their location may be contaminated. It is possible that NWFWMD may condition the permit with more stringent well construction standards, and where applicable, the depth of the well may be limited.

After review of the remedial objectives for both OU-1 and OU-2, no areas of noncompliance have been identified. O&M activities are being conducted as outlined in the OU-1 September 1996 and OU-2 November 1998 O&M documents. The remedial action with regard to abandonment of irrigation wells within OU-2 is ongoing and is considered as part of the O&M activities for OU-2.

To be completed by EPA

The next five-year review will be conducted by March 27, 2004.

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TABLE 1

GROUND WATER ANALYTICAL RESULTS

OU-1 AGRICO SITE
PENSACOLA, FLORIDA

WELL ID	DATE SAMPLED	PARAMETERS (mg/L)		
		ARSENIC	LEAD	FLUORIDE
ACB-31S	May-97	< 0.010	< 0.0050	< 0.20
	Nov-97	< 0.010	< 0.0050	< 0.20
	May-98	< 0.010	< 0.0050	< 0.20
	Nov-98	< 0.010	< 0.0050	< 0.20
	May-99	< 0.010	< 0.0050	< 0.20
	Nov-99	< 0.010	< 0.0050	< 0.20
ACB-32S	May-97	< 0.010	< 0.0050	< 0.20
	Nov-97	< 0.010	< 0.0050	< 0.20
	May-98	< 0.010	< 0.0050	< 0.20
	Nov-98	< 0.010	< 0.0050	< 0.20
	May-99	< 0.010	< 0.0050	< 0.20
	Nov-99	< 0.010	< 0.0050	< 0.20
ACB-33S	May-97	< 0.010	< 0.0050	0.81
	Nov-97	< 0.010	< 0.0050	0.82
	May-98	< 0.010	< 0.0050	1.7
	Nov-98	< 0.010	< 0.0050	0.47
	May-99	0.017	0.0063	0.29
	Nov-99	< 0.010	< 0.0050	0.26
AC-7SR	May-97	0.014	0.012	**19.0**
	Nov-97	0.012	0.011	**9.1**
	May-98	0.017	**0.028**	**10.0**
	Nov-98	< 0.010	0.011	**6.7**
	May-99	0.020	**0.022**	**7.4**
	Nov-99	< 0.010	< 0.0050	**6.4**
ACB-34S	May-97	< 0.010	< 0.0050	**16.0**
	Nov-97	< 0.010	< 0.0050	**9.5**
	May-98	< 0.010	< 0.0050	**6.3**
	Nov-98	< 0.010	< 0.0050	3.8
	May-99	< 0.010	< 0.0050	3.5
	Nov-99	< 0.010	< 0.0050	2.5

Notes: Performance standards for OU-1 constituents are:
Arsenic: 0.05 mg/L
Lead: 0.015 mg/L
Fluoride: 4 mg/L

TABLE 2
COMPARISON OF COC RESULTS 1992,1997,1999 AT LONG-TERM MONITORING LOCATIONS FOR SURFICIAL ZONE MAIN PRODUCING ZONE

OU-2 AGRICO SITE
PENSACOLA, FLORIDA

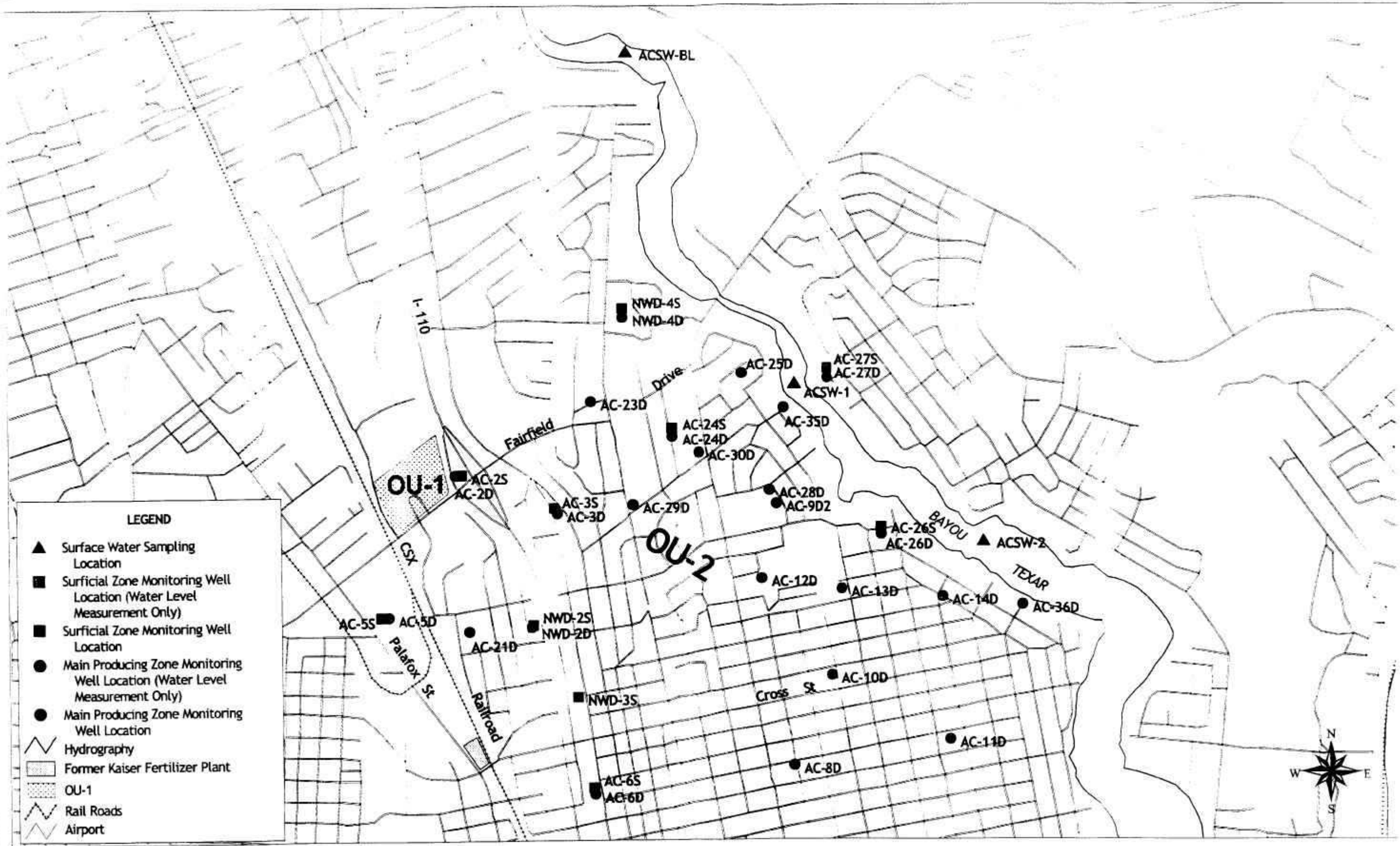
Well I.D.	DATE	Fluoride (mg/L)	Arsenic (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Nitrate/Nitrite (mg/l)	Combined Radium 226/228 (pCi/l)
PERFORMANCE STANDARD		4	0.05	250	250	10	5
SURFICAL ZONE							
AC-2S	2/1992	**98**	**0.0741**	20	**330**	**15**	1.6
	9/1997	**130**	**0.058**	10	150	9	1.7
	11/1999	**98**	0.029	7	57	5	<1.5
AC-3S	2/1992	<0.20	<0.010[1]	5.5	27	2.9	2.2
	9/1997	1.4	<0.010	3.8	24	0.92	<0.60
	11/1999	<0.20	<0.010	5.7	14	1.1	<1.5
AC-5S	2/1992	<0.20	<0.010[1]	9.3	27	6.4	NS
	9/1997	<0.20	<0.010	8.6	27	4.3	1.3
	11/1999	<0.20	<0.010	19	29	5.9	1.98
AC-24S	2/1992	<0.20	NS	8	7.4	1.6	NS
	9/1997	<0.20	<0.010	8.4	9.7	1.4	<0.60
	11/1999	<0.20	<0.010	8	8.8	1.1	<1.5
AC-26S	2/1992	<0.20	NS	10	13	0.95	NS
	9/1997	<0.20	<0.010	12	21	2.9	<0.60
	11/1999	<0.20	<0.010	20	17	2.1	4.97
NWD-2S	2/1992	**4.2**	<0.010[1]	8.2	19	4.6	NS
	9/1997	**5.2**	<0.010	4	25	3	1.2
	11/1999	**4.2**	<0.010	7.1	30	3.5	1.1
NWD-4S	2/1992	<0.20	NS	6.1	<5.0	1.3	2.2
	9/1997	<0.20	<0.010	4.7	<5.0	0.41	<0.60
	11/1999	<0.20	<0.010	7.2	<5.0	0.31	1.42
MAIN PRODUCING ZONE							
AC-2D	2/1992	**5.5**	<0.010[1]	16	7.9	3.5	**9.8**
	9/1997	2.9	<0.010	12	26	5.6	0.64
	11/1999	3.5	<0.010	11	15	3.6	<1.5
AC-3D	2/1992	**80**	<0.010[1]	**270**	**570**	**42**	**20.8**
	9/1997	**46**	<0.010	110	**460**	**27**	**16.81**
	11/1999	**14**	<0.010	19	<5.0	**12**	2.12
AC-8D	2/1992	<0.20	<0.010[1]	NS	2.7	NS	NS
	9/1997	<0.20	<0.010	14	<5.0	6.7	<0.80
	11/1999	<0.20	<0.010	17	<5.0	8.1	3.69
AC-12D	2/1992	2.6	<0.010[1]	NS	NS	NS	NS
	9/1997	**8.8**	0.012	20	**320**	11	8.4
	11/1999	0.52	<0.010	6.4	7.8	2.4	<1.5
AC-25D	2/1992	**19**	NS	120	7.1	1.4	NS
	9/1997	**20**	<0.010	**270**	44	2.1	5.5
	11/1999	2.6	<0.010	45	<5.0	1.9	<1.5

TABLE 2
COMPARISON OF COC RESULTS 1992,1997,1999 AT LONG-TERM MONITORING LOCATIONS FOR SURFICIAL ZONE MAIN PRODUCING ZONE

OU-2 AGRICO SITE
PENSACOLA, FLORIDA

Well I.D.	DATE	Fluoride (mg/L)	Arsenic (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Nitrate/Nitrite (mg/l)	Combined Radium 226/228 (pCi/l)
PERFORMANCE STANDARD		4	0.05	250	250	10	5
AC-29D	2/1992	NS	NS	NS	NS	NS	NS
	9/1997	65	<0.010	180	340	10.56	10.56
	11/1999	65	<0.010	110	<5.0	10.46	10.46
AC-30D	2/1992	NS	NS	NS	NS	NS	NS
	9/1997	15	<0.010	60	100	10.9	10.9
	11/1999	18	<0.010	70	130	12.13	12.13
AC-35D	2/1992	NS	NS	NS	NS	NS	NS
	9/1997	NS	NS	NS	NS	NS	NS
	11/1999	23	<0.010	160	130	<1.5	<1.5
AC-36D	2/1992	NS	NS	NS	NS	NS	NS
	9/1997	NS	NS	NS	NS	NS	NS
	11/1999	0.79	<0.010	28	120	<1.5	<1.5

Notes: NS = Not Sampled
1 = First date for arsenic is 1990 data results
mg/L = milligrams per liter
pCi/L -= picocuries per liter



OU-2
AGRICO SITE
PENSACOLA, FLORIDA

URS Greiner Woodward Clyde

0.3 0 0.3 0.6 Miles

Base map Data Provided by:
Florida Department of Environmental Protection
and Northwest Florida Water Management District

Projection: UTM
Zone: 16
Datum: NAD 27

SITE LOCATION MAP, GROUND WATER, AND SURFACE WATER SAMPLING LOCATIONS

FIGURE 1

C. Beauvais - Tallahassee
1/3/99

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